FLUKE®

Instruction Sheet

80PK-2

Type K Immersion Probe

WARNING

TO AVOID ELECTRICAL SHOCK, DO NOT USE THIS PROBE WHEN VOLTAGES EXCEEDING 24V AC RMS OR 60V DC ARE PRESENT. THE PROBE TIP IS ELECTRICALLY CONNECTED TO THE OUTPUT TERMINALS.

INTRODUCTION

The 80PK-2 Type K Thermocouple Immersion Probe is designed for use in liquids or gels. It can also be used in most other temperature applications. The thermocouple junction is protected from tip to handle by an Inconel sheath. The 4-foot cable is terminated with a Type K miniature thermocouple connector with 0.792-mm (0.312-inch) pin spacing. The 80PK-2 can be used with any temperature measuring instrument that is designed to accept Type K thermocouples and has a miniature connector input.

SPECIFICATIONS

Type: K Special Grade Ni-Cr vs Ni-Al (Chromel vs Alumel)

Measurement Range: -196°C to 927°C (-320°F to 1700°F)

Accuracy (with respect to NBS tables):
Note: All error calculations should be done in °C, then scaled to °F.

RANGE	ACCURACY (% of reading)
-196°C to -110°C (-320°F to -166°F)	±2% (°C)
-110°C to -40°C (-166°F to -40°F)	±2.2°C
-40°C to 275°C (-40°F to 527°F)	±1.1°C
275°C to 927°C (527°F to 1700°F)	±.4% (°C)

Output: @25°C (77°F) = 1.00 mV (reference junction at 0°C)

Seebeck Coefficient: @25°C (77°F) = 40.50 μV/°C

Measurement Time (Time Constant): .7 seconds for water moving at .9 meters/second (3 feet/second). Complete step change equals 5 time constants (3.5 seconds).

Maximum Voltage: 24V ac rms or 60V dc

Maximum Temperature of Tip: 927°C (1700°F)

Sheath

Material: Inconel
Dimensions: 3.175 mm (⅛ inch) in diameter, 15.24 cm (6 inches) in length

Grounding: Junction welded to sheath

Cable:

Length: 1.2 meters (4 ft.)
Insulation:
Material: PVC
Maximum Temperature: 105°C (220°F)

Conductors:

Type: K
Size: AWG #24 stranded (7 strands of #32)
Length: 122 cm (48 inches) nominal

Polarity and Color Coding:

Chromel: + yellow
Alumel: - red
Outer Jacket: black

Handle:

Material: Hytrel
Maximum Temperature: 175°C (347°F)

Connector:

Type: yellow mini-thermocouple connector with .792mm (0.312-inch) pin spacing
Material: Hytrel
Maximum Temperature: 175°C (347°F)

Dimensions: overall length 22.7 cm (8.95 inches) from probe tip to end of cable strain relief

Protection: Class 3. Relates solely to insulation and grounding properties defined in IEC 348.

MEASUREMENT CONSIDERATIONS

Instrument Compatibility

The 80PK-2 is designed to be compatible with any temperature measuring instrument that accepts K-type thermocouples, has a miniature thermocouple connector, and has cold reference junction compensation. Accuracy of the temperature measuring instrument must be considered along with the 80PK-2 accuracy specification in order to determine the overall accuracy of the combination.

Temperature Limitations

The probe tip of the 80PK-2 has a continuous temperature rating of 927°C (1700°F). However, the opposite end of the sheath nearest the handle should not be subjected to temperatures greater than 175°C (347°F). This is the maximum temperature limitation of the handle.

Media Limitations

The sheath material of the 80PK-2 is Inconel, an alloy of chromium and nickel. It has excellent resistance to oxidation and corrosion at high temperatures, but it should not be used in the presence of sulfur above 537°C (1000°F).

OPERATION

Use the 80PK-2 as follows:

1. Connect the 80PK-2 to a compatible Type K temperature measuring instrument using the miniature (0.312-inch pin spacing) thermocouple connector.

2. Turn on the measuring instrument and select the appropriate range and scale.

3. Check the readout on the measuring instrument. With no heat or cold source applied to the bead, the measuring instrument should display the ambient (room) temperature. If the instrument does not readout properly, refer to the TROUBLESHOOTING section below.

MEASURING TECHNIQUE

The 80PK-2 Immersion Probe should be inserted at least 6.35cm (2.5 inches) into the environment to be measured to minimize the shunting effect of the sheath.

TROUBLESHOOTING

With no heat or cold applied to the probe, the measuring instrument should display the ambient temperature. If the measuring instrument does not readout properly, try the following:

1. Verify that the temperature measuring instrument is designed to be used with Type K thermocouples. It should have a yellow input connector and/or be marked "K".

2. Check for an open circuit indicator on the measuring instrument. Some temperature measuring instruments have a built-in circuit to indicate if the connected probe is open. (All Fluke temperature measuring instruments have this feature.) Refer to the measuring instrument's owner's manual to see if this feature is available.

Short the two input pins of the measuring instrument with a piece of wire. If the instrument is functioning, it should indicate the ambient temperature.

3. If you suspect a broken connection, use an ordinary ohmmeter to read the continuity of the probe from pin to pin. The ohmmeter should read 20 ohms or less if there is continuity.

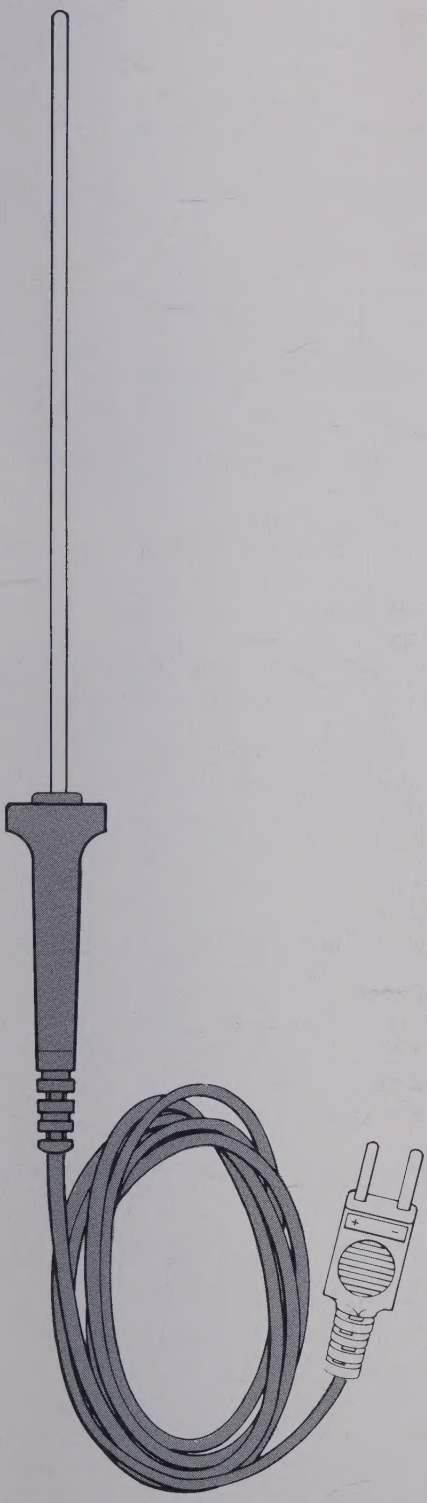
SCALE CONVERSIONS

To convert °C to °F:

$$(°C \times 1.8) + 32 = °F$$

To convert °F to °C:

$$(°F - 32) \times .5556 = °C$$



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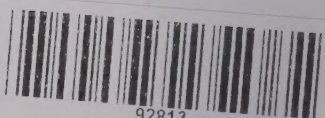

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